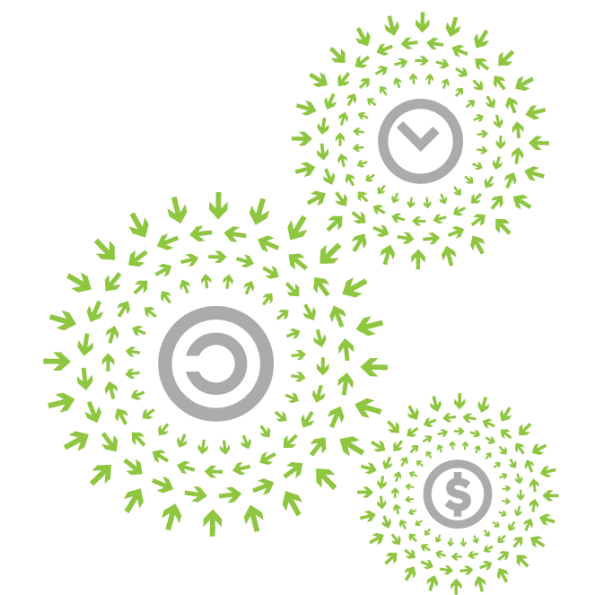# OCP's Rack Manager Controller subproject (OpenRMC)

John Leung, Principle Engineer
Intel Corporation

Han Wang, Senior Architect
Inspur

OPEN
PLATINUM™

OCP
REGIONAL
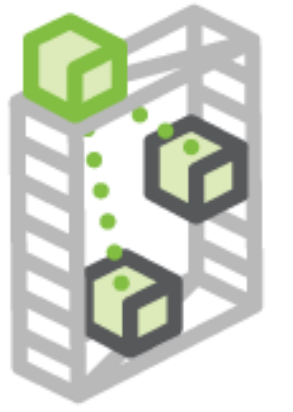SUMMIT

Open. Together.

OpenRMC Overview

OpenRMC

- Goals and Motivation

- Logistics and meetings

Status

- Reviewed of existing rack management implementations

- Specifying interface and requirements

- Received Code Contributions

RMC for openEdge Platform

OPENRMC

Specifications

Embedded
Software

The OpenRMC Goals

Specify the Rack Manager Controller service interfaces
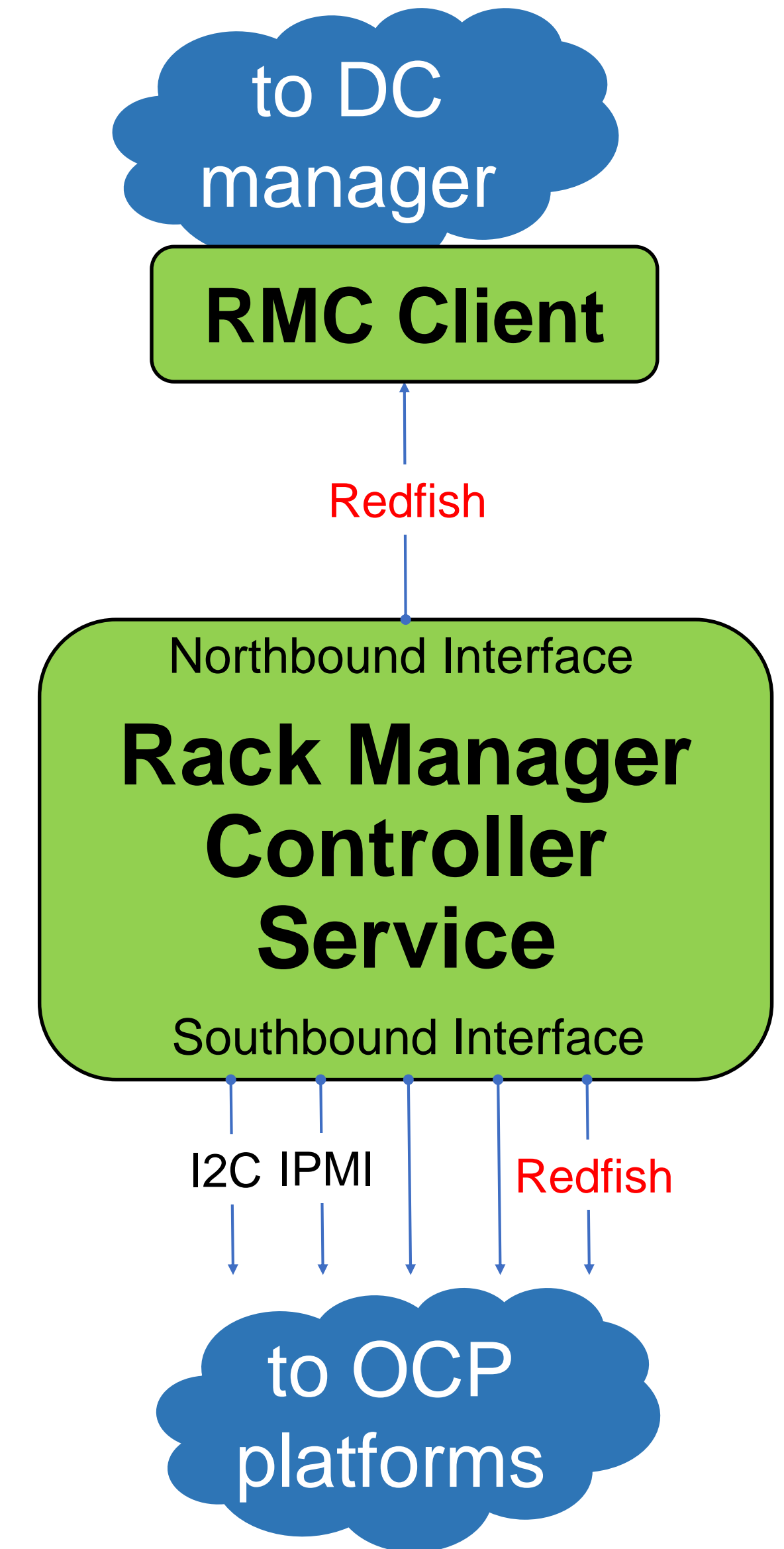
- Northbound interface to datacenter manager (spec)
- Southbound interface requirements to OCP platforms in the rack

Deliver a Rack Manager implementation

- Available as open source
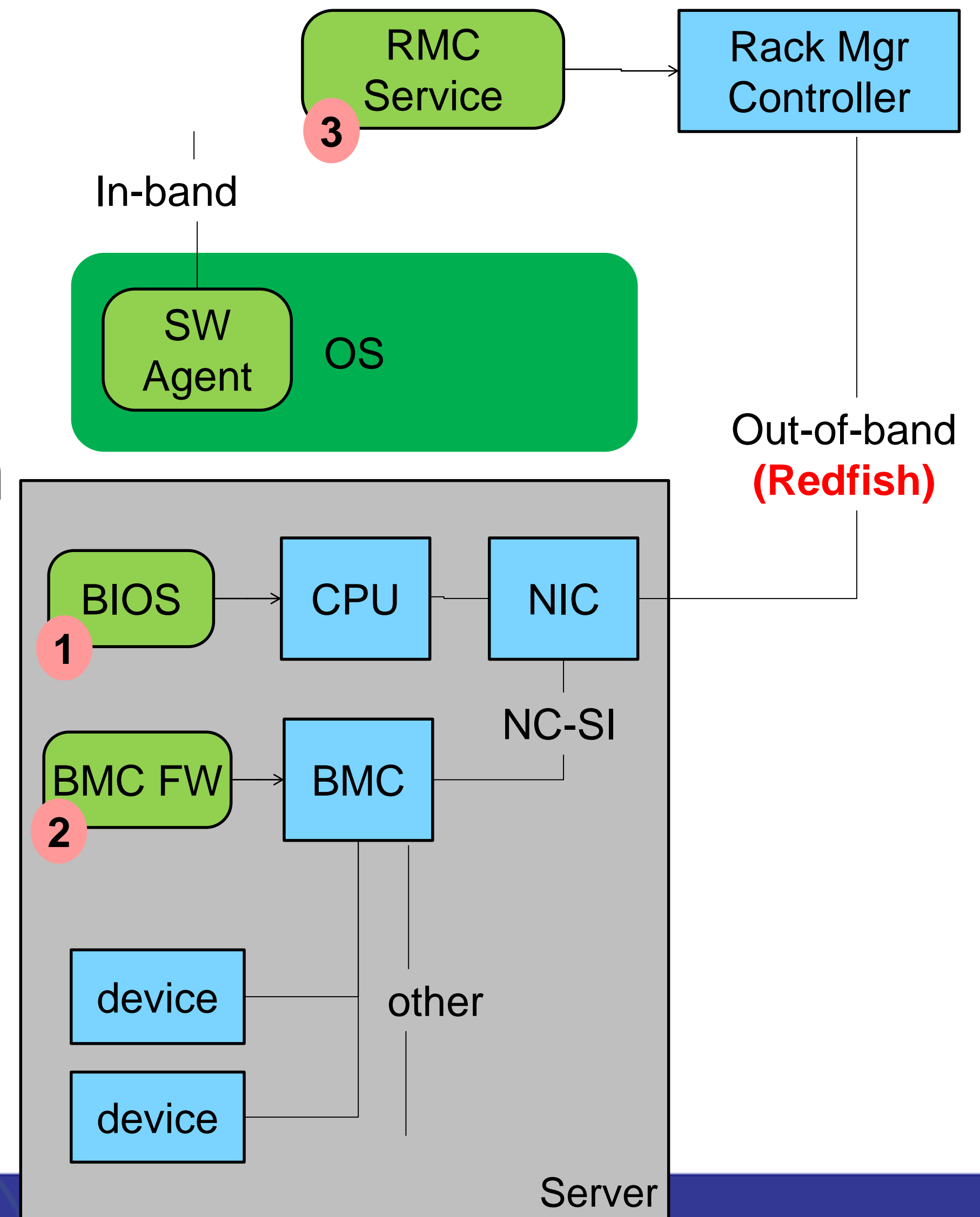
OCP compliant hardware designs

- Handled by other OCP projects

to DC manager

RMC Client

Redfish

Northbound Interface

Rack Manager Controller Service

Southbound Interface

I2C IPMI Redfish

to OCP platforms

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Motivation for OpenRMC

1. System Firmware (BIOS)
   - OCP System Firmware project

2. BMC Firmware
   - OpenBMC governed by Linux Foundation

3. Rack Manager Software/Firmware
   - OCP OpenRMC

- With OpenBMC, the industry unified the various repositories in 2018
- With rack manager, OCP will provide a source repository and prevent splintering
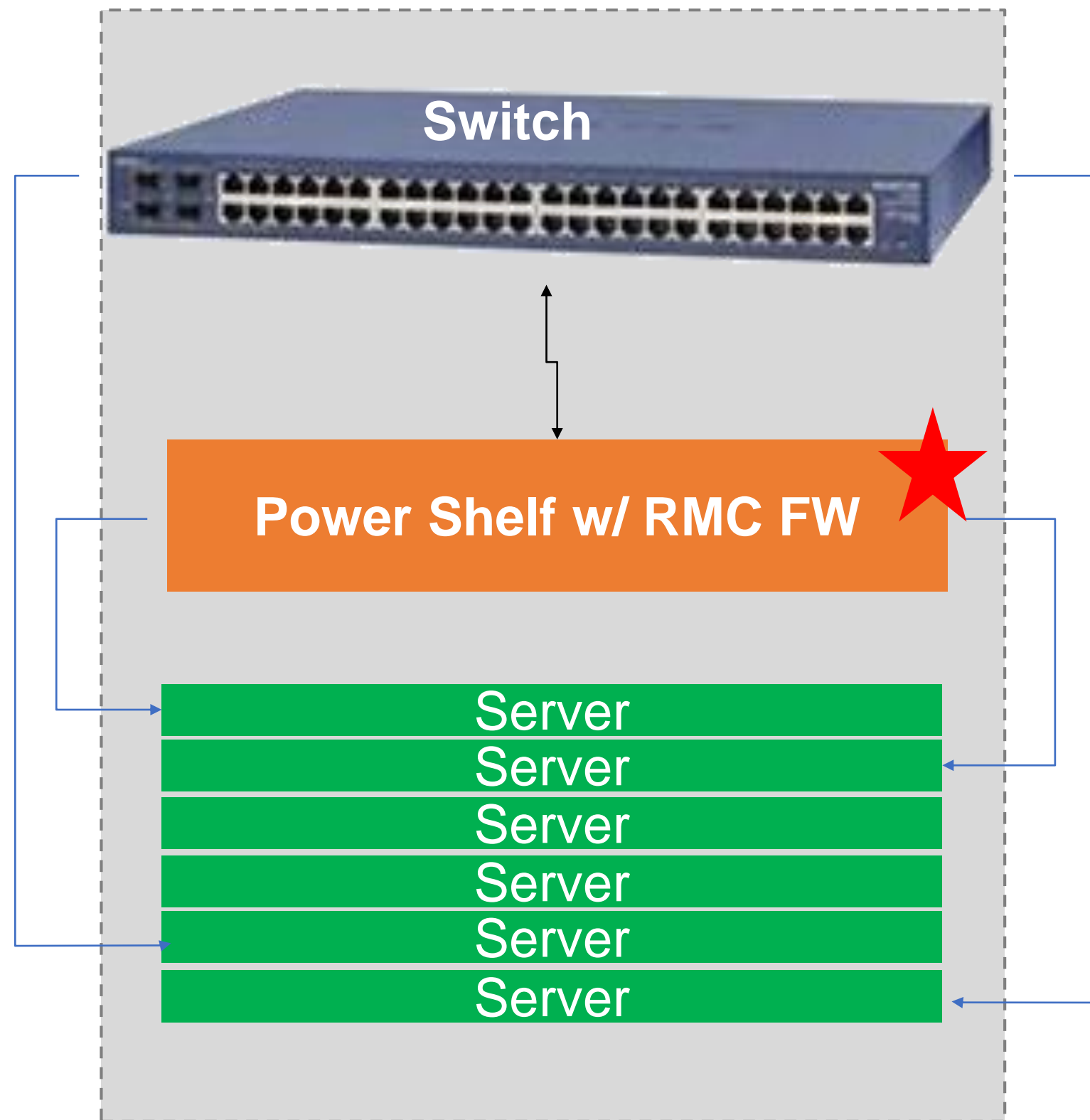

RMC Service

Rack Mgr Controller

In-band

SW Agent   OS

Out-of-band **(Redfish)**

BIOS → CPU → NIC

NC-SI

BMC FW → BMC

device

device   other

Server

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SUMMIT

The RMC can be hosted in various locations

OpenRACK
(within power shelf)

EIA, OpenRACK
(within switch)

Olympus
(standalone)

Switch

Power Shelf w/ RMC FW

Server
Server
Server
Server
Server
Server

Switch w/ RMC FW

Server
Server
Server
Server
Server
Server

RMC FW

Switch

Server
Server
Server
Server
Server
Server

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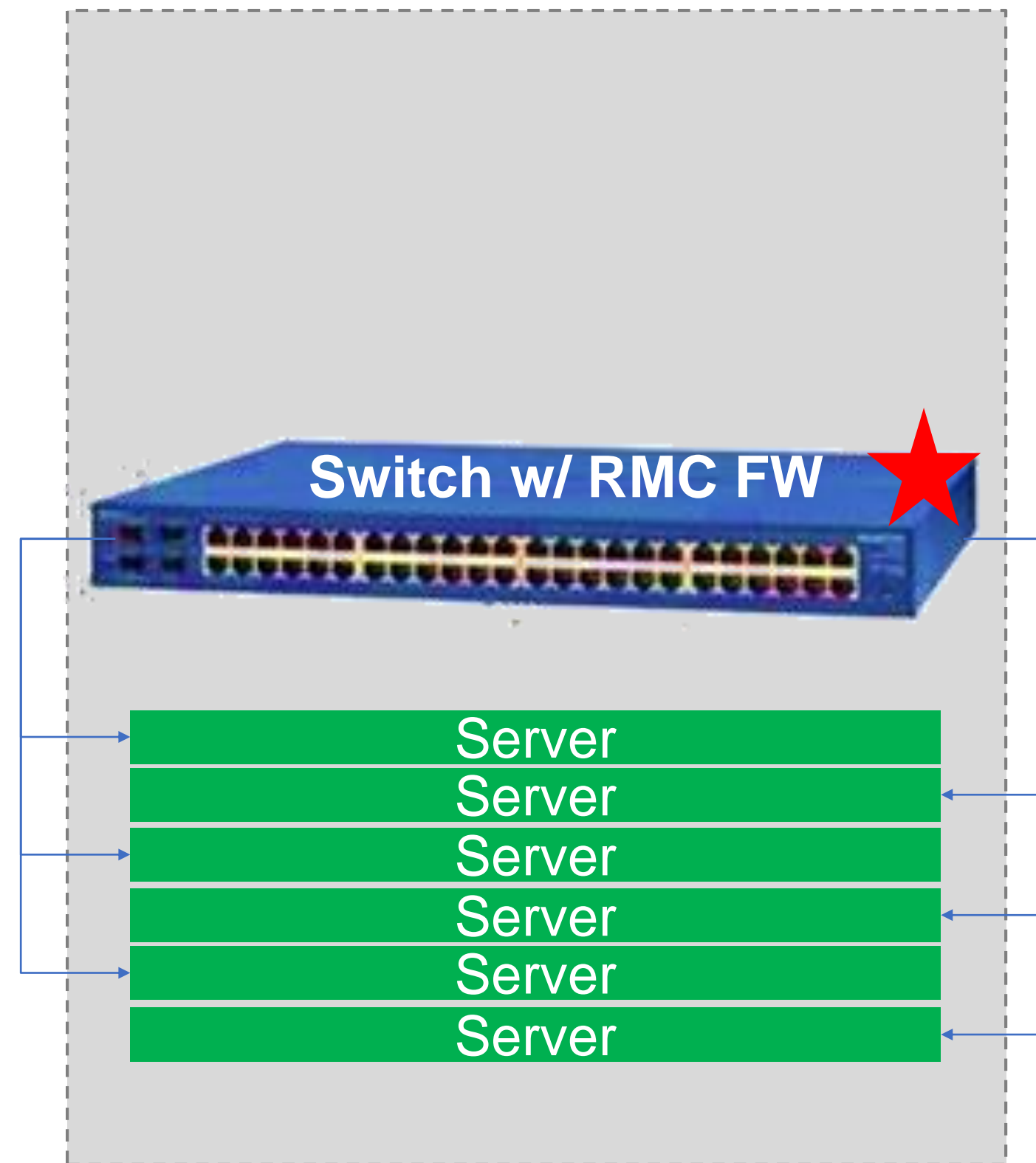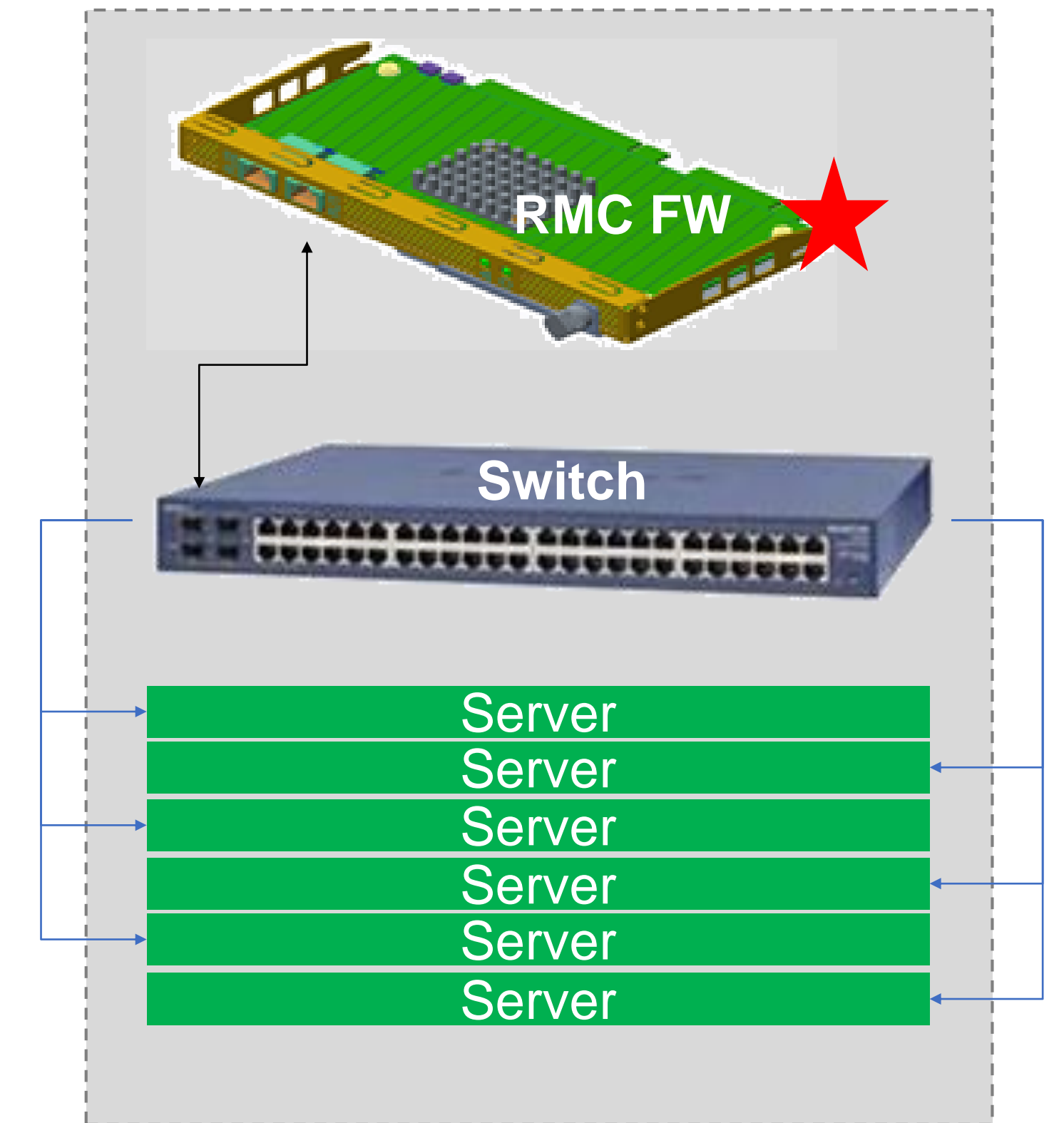
Logistics

- A subproject of the Hardware Management project
  - John Leung (Intel) and Han Wang (Inspur) are co-chairs
  - Wiki
  - Mail-list
- Participation
  - ARM, Microsoft, Facebook, Huawei, Inspur, Nokia, Intel, etc

OpenRMC project has since Nov 2018

Reviewed and compare

- Existing RMC interfaces and architectures from Facebook, Intel, Inspur and Microsoft ([Comparison of interfaces](#))

Draft specifications and requirments

- Draft of [Northbound API Specification](#)

- Draft of Southbound interface requirements

Reviewed RMC code contributions

- From Microsoft, Inspur, and Intel

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Source Repository

On OCP Github (github.com/opencomputeproject/Rack-Manager)

Contrib-Microsoft, Contrib-Inspur, Contrib-Intel folders

./OpenRMC folder

	Language	Architecture	Processor	Memory
Microsoft	C++	OpenBMC	AST2500	
Inspur	C++	OpenBMC	AST2500	
Intel	C++		Intel NUC	

OpenRMC project goals

Replacing firmware binaries with buildable source

- An OCP location exists for RMC sources

- OCP RMC contribution can reference the source repository

Open RMC

- RMC source that conform to the OpenRMC Northbound API

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Nokia Airframe openEdge Chassis

Open edge chassis overview

Key specifications

- Cooling: Fan units are part of sled solution
  - Air flow direction configurable: front to rear/rear to front
- Chassis management controller (RMC)
  - PSU management (control, sensors, ..)
  - Management Ethernet interface to sleds
    - 1 GE to all sleds via backplane
    - 1x 1 GE (RJ45) + 2x 10 GE (SFP+) front panel interface for external connectivity and chaining of multiple chassis
- Power distribution board and chassis backplane provide connectivity between RMC, sleds and PDUs
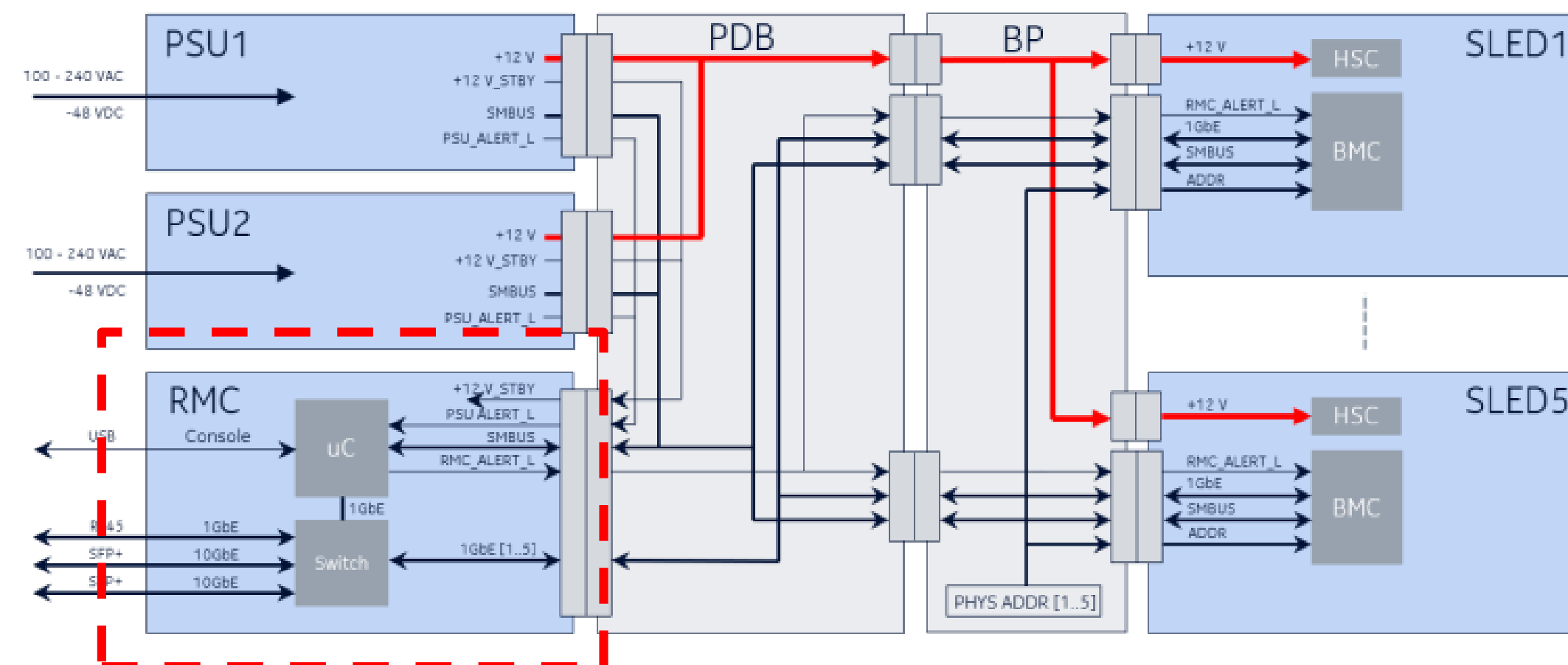
Airframe openEdge RMC

RMC
Management unit

Chassis management controller (RMC)

- PSU management (control, sensors, ..)
  - Control and supervision of PSUs
  - Access to sensor data (voltages, currents, power consumption)
- RMC controller from AST2500 family
  - USB debug port in front panel
- On-board unmanaged Ethernet switch simplifies HW management connectivity
  - Single management interface for entire chassis
    - 1 GE management Ethernet interface to all sleds via backplane (1000BASE-T)
    - 1x 1 GE (RJ45, 1000BASE-T)
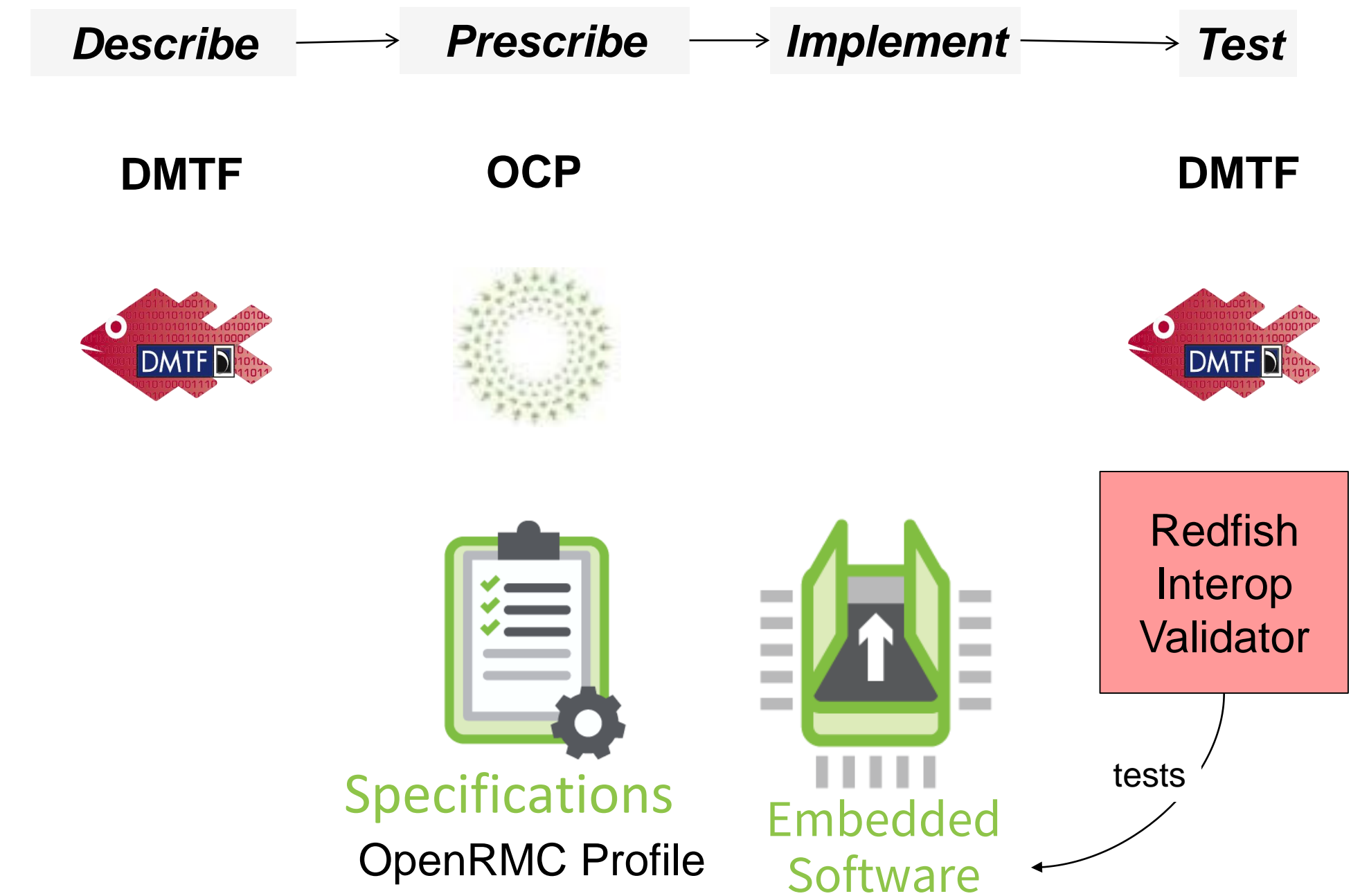   - 2x 10 GE (SFP+) front panel interface for external connectivity and chaining of multiple chassis
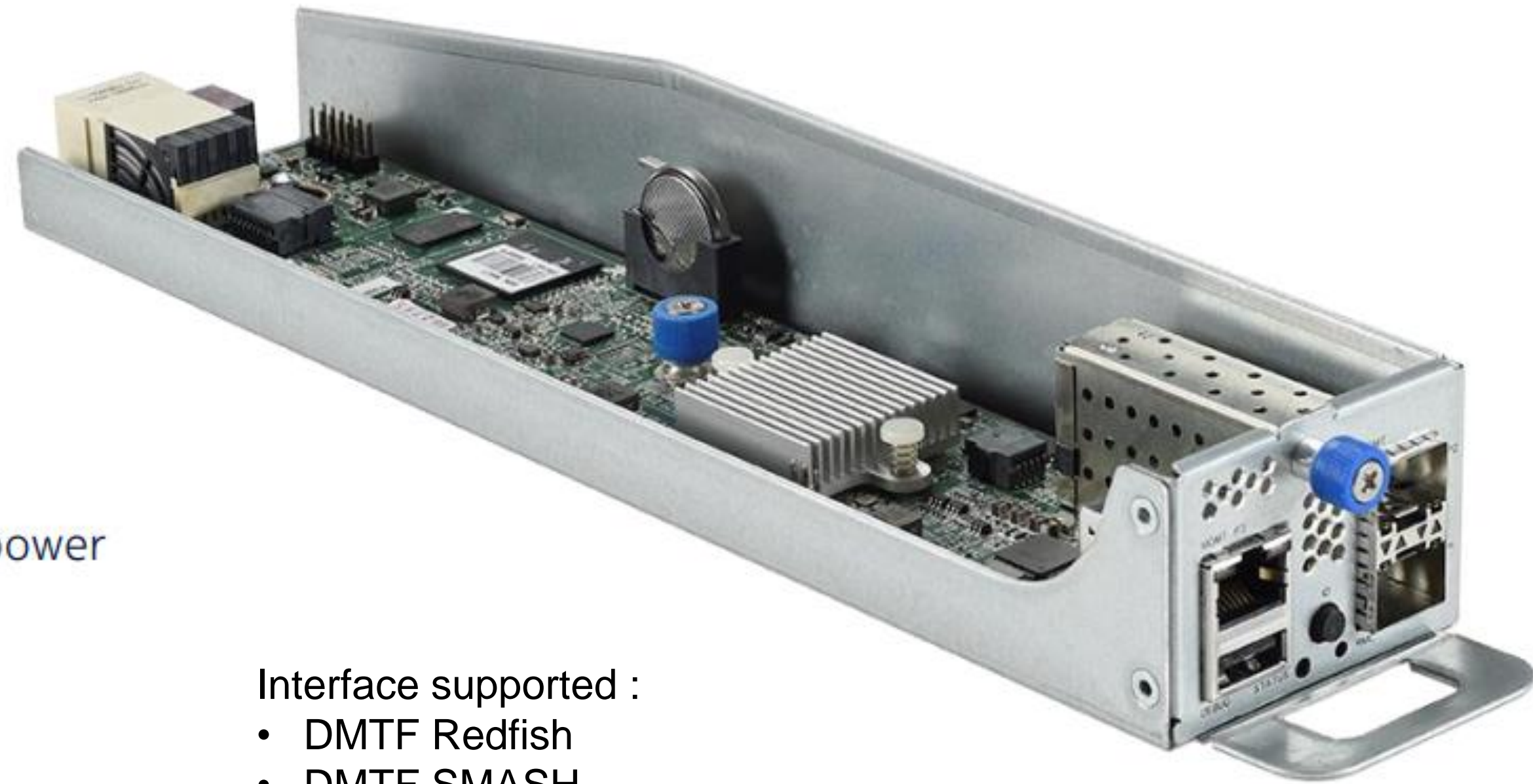
Interface supported :
- DMTF Redfish
- DMTF SMASH
- IPMI
- SNMP

NOKIA
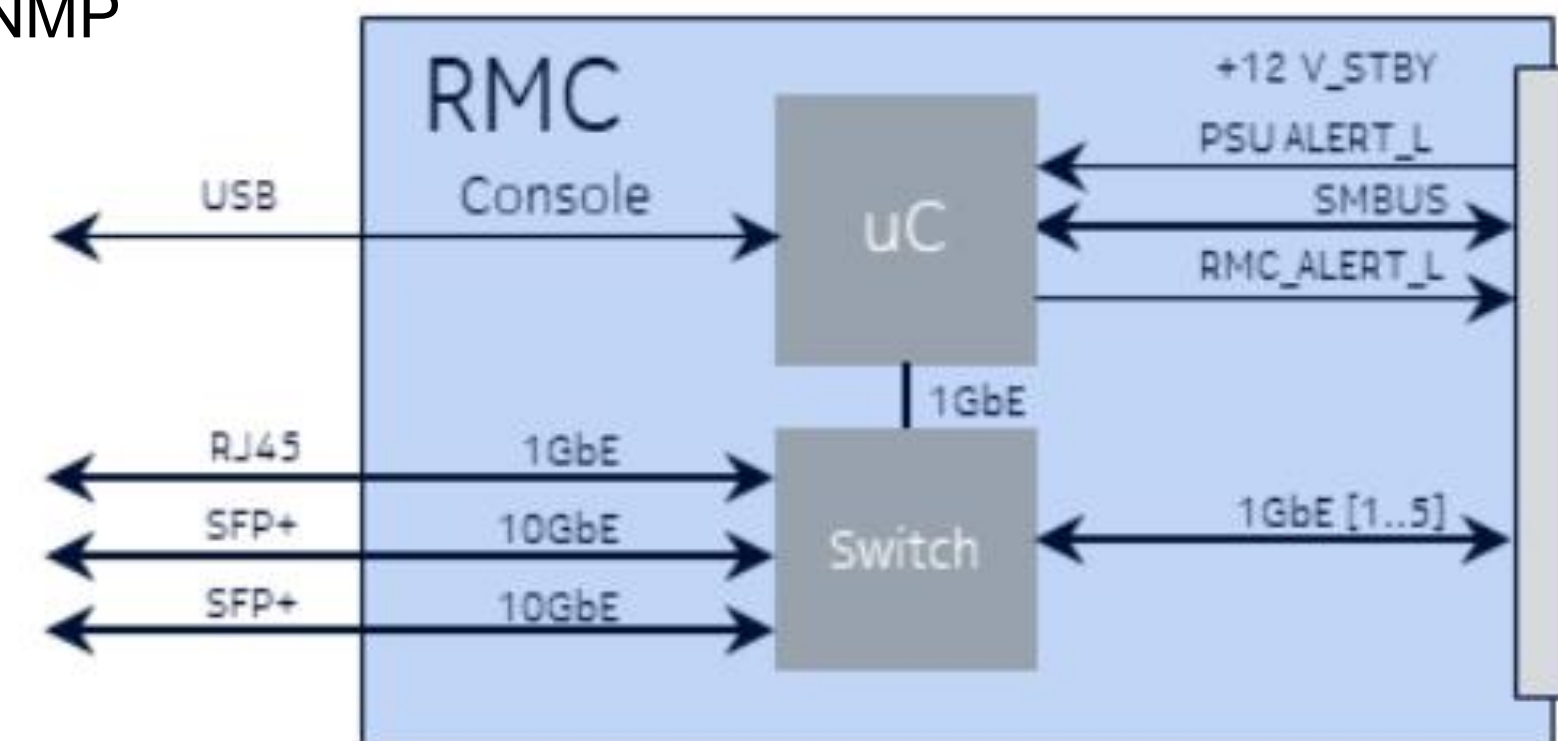
Testing OpenRMC conformance

- The **OpenRMC profile** file represents the Northbound interface specification in a JSON format (Redfish resources & properties)

- The Redfish Interop Validator: 1) reads the OpenRMC profile, 2) autogenerates the tests, and 3) runs them against an implementation

- The Interop Validator is a component of the Redfish conformance test suite, which also includes
  - Redfish Service Conformance Check
  - Redfish Service Validator
  - Redfish Usecase Checkers

Describe	*Prescribe*	*Implement*	*Test*
DMTF	OCP		DMTF

Specifications
OpenRMC Profile

Embedded Software

Redfish Interop Validator

tests

Status against Goals

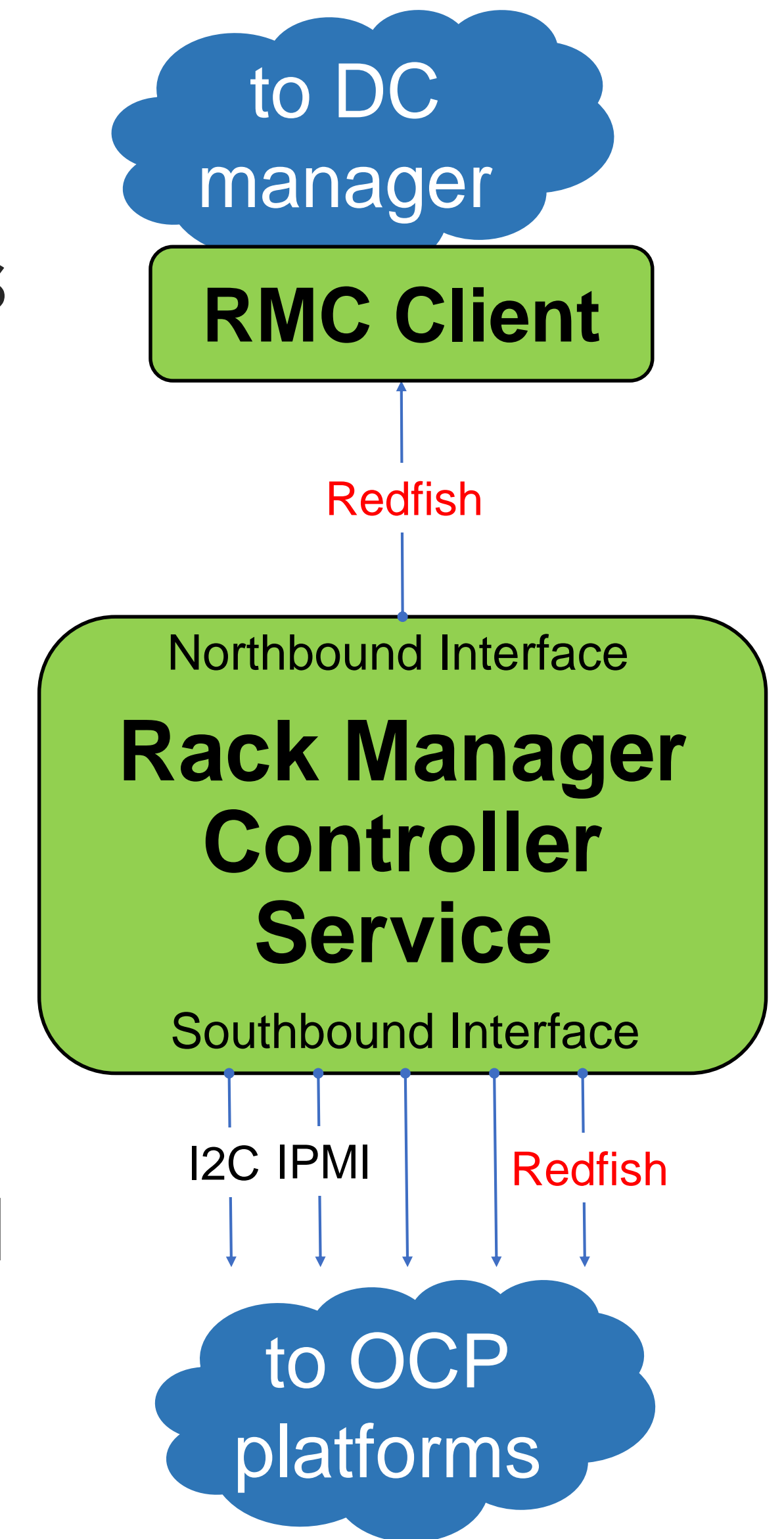**Specify the Rack Manager Controller service interfaces**

- OpenRMC Northbound interface (v0.3) in review
- Expect to be proper subset of openEdge RMC requirements

Deliver a Rack Manager implementation

- Three RMC code repositories in an OCP Github location

OCP compliant hardware designs

- Expect contributions to conform to the OCP OpenRMC profile
- Expect contributions to include buildable source, instead of a firmware image

to DC manager

RMC Client

Redfish

Northbound Interface

Rack Manager Controller Service

Southbound Interface

I2C IPMI   Redfish

to OCP platforms

OCP SUMMIT

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Call to Action

- Join the OpenRMC discussion
  - OpenRMC@OCP-All.groups.io
- Participate in the OpenRMC meetings
  - opencompute.org/wiki/Hardware_Management/Open_RMC
- Contribute to the OpenRMC source & profile
  - github.com/opencomputeproject/Rack-Manager
  - github.com/opencomputeproject/OCP-Profiles